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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/603,393	06/23/2000	JASON F. MCCULLOUGH	062891.0347	1091

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EXAMINER
AHN, SAM K

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 03/24/2004   4

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *amendment, received on 1/6/04*.

2a)☐ This action is **FINAL**.　　2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-11,13-19,21-27 and 29-33* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *9* is/are allowed.

6)☒ Claim(s) *1-5,7,8,10,11,13-19,21-27 and 29-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some * c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
　　Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-5, 7-11, 13-19, 21-27 and 29-33 have

been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 10, 11, 15, 18, 19, 21, 23, 26, 27, 29 and 31 are rejected under 35

U.S.C. 103(a) as being unpatentable over Kao (cited previously) in view of Lim.

Regarding claim 1, 4, 10, 15, 18, 21, 23, 26, 29 and 31, Kao's teaching of an

apparatus of digital subscriber line (xDSL) communications device comprises a

digital engine (DMT Tx Core - 250 in Fig.2) assigning bits of data for transmission

in an allocated bandwidth. (note col.9, lines 39-45) Further, RAM (430) stores

provisional parameters and trained parameters (note col.11, lines29-48) where

the raw data or provisional parameters are initialized. (note col.11, line 55 –

col.12, line 20) The controller (418 in Fig.4) performs energy and bit loading

process where the available bandwidth is determined by going through the steps

of finding minimum and maximum bit capacities for each subchannel and

calculating the total bit rate. (note col.12, line 21- col.13, line 45) When total

power exceeds the power margin, one of the provisioned parameter, the total bit

rate is reduced. (540 in Fig.5) When reducing bit rates, some of the subchannel

may be disabled. (note col.13, lines 19-29) With the disabling of some

subchannels, only a portion of the available bandwidth is assigned as the

allocated bandwidth due to power margin. As a result, the power spectrum is

adjusted to correspond with the allocated bandwidth, since some of the

subchannels are disabled. In regards to the limitation wherein the frequency

range corresponding to a low frequency bins, wherein the frequency bins provide

data throughput equal to the provisioned parameters, one skilled in the art would

analyze that the spectrum taught by Kao covers the full spectrum, including the

low frequency. And further, it is inherent that the data throughput would be equal

to the provisioned parameters, otherwise, the system would adjust further to

match the provisioned parameters.

However, Kao does not explicitly disclose a line driver providing power

across for transmitting bits of data. Although it is not mentioned by Kao, it is

inherent that a line driver is comprised in Kao's system as it is a critical

component needed to transmit data in any system. Further, Lim teaches dsl

system, in the same field of endeavor, comprising a line driver coupled to a

hybrid circuit (see 7 in Fig.1) where the line driver provides power on the line for

transmission. Lim further teaches wherein the controller adjusts the effective

power spectrum by adjusting the analog characteristics and reducing a frequency

cutoff (including high frequency, see Fig.7A, 7B) of the line driver, and also

teaches adjusting the effective power spectrum to correspond with the allocated

bandwidth (note col.12, line 53- col.13, line 8) It would have been obvious to one

skilled in the art at the time of invention to include a line driver, such as Lim's

teaching of 7 in Fig.1, coupled to a hybrid block (220 in Fig.2 of Kao) for the

purpose of effectively transmitting data across the dsl link to a distant receiver.

Regarding claim 2, Kao in view of Lim teach all subject matter claimed, as

applied to claim 1. Kao further teaches the DSL communications device

connected to customer premises equipment through a twisted pair line forming a

local loop or a copper wire loop. (note col.9, lines 16-28)

Regarding claims 3, 11, 19 and 27, Kao in view of Lim teach all subject matter

claimed, as applied to claim 1. The limitation of upstream and downstream

frequency bandwidth, upstream and downstream margin parameters comprised

in the trained parameters are inherent as these parameters are essential

parameters in a dsl system. (and note col.11, lines 29-48) Kao further teaches

the available bandwidth comprises the downstream frequency bandwidth, since

the total bit rate is for the downstream.

3. Claims 5, 14, 22 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable
over Kao (cited previously) in view of Lim in further view of Ott et al. (Ott).

Regarding claims 5, 14, 22 and 30, Kao's teaches method and apparatus of a
digital subscriber line (xDSL) communications device comprises a digital engine
(DMT Tx Core - 250 in Fig.2) assigning bits of data for transmission in an
allocated bandwidth. (note col.9, lines 39-45) Further, RAM (430) stores
provisional parameters and trained parameters (note col.11, lines29-48) where
the raw data or provisional parameters are initialized. (note col.11, line 55 –
col.12, line 20) The controller (418 in Fig.4) performs energy and bit loading
process where the available bandwidth is determined by going through the steps
of finding minimum and maximum bit capacities for each subchannel and
calculating the total bit rate. (note col.12, line 21- col.13, line 45) When total
power exceeds the power margin, one of the provisioned parameter, the total bit
rate is reduced. (540 in Fig.5) When reducing bit rates, some of the subchannel
may be disabled. (note col.13, lines 19-29) With the disabling of some
subchannels, only a portion of the available bandwidth is assigned as the
allocated bandwidth due to power margin. As a result, the power spectrum is
adjusted to correspond with the allocated bandwidth, since some of the
subchannels are disabled.

However, Kao does not explicitly disclose a line driver providing power across for
transmitting bits of data. Although it is not mentioned by Kao, it is inherent that a

line driver is comprised in Kao's system as it is a critical component needed to transmit data in any system.

Further, Lim teaches dsl system supporting DMT and CAP protocol (note col.2, lines 24-58), comprising a line driver coupled to a hybrid circuit (see 7 in Fig.1) where the line driver provides power on the line for transmission. Lim further teaches wherein the controller adjusts the effective power spectrum by reducing a frequency cutoff of the line driver, and also teaches adjusting the effective power spectrum to correspond with the allocated bandwidth (note col.12, line 53-col.13, line 8) It would have been obvious to one skilled in the art at the time of invention to include a line driver, such as Lim's teaching of 7 in Fig.1, coupled to a hybrid block (220 in Fig.2 of Kao) for the purpose of effectively transmitting data across the dsl link to a distant receiver. In regards to the limitation wherein the frequency range corresponding to a low frequency bins, wherein the frequency bins provide data throughput equal to the provisioned parameters, one skilled in the art would analyze that the spectrum taught by Kao covers the full spectrum, including the low frequency. And further, it is inherent that the data throughput would be equal to the provisioned parameters, otherwise, the system would adjust further to match the provisioned parameters.

However, Kao in view of Lim do not explicitly teach wherein the provisioned parameters comprises baud rate in order to match the allocated bandwidth with the provisioned parameters. Ott teaches, in the same field of endeavor, training of DSL modems including baud rate. (note col.5, lines 14-51) Kao and Ott, both

includes adaptive rate modems, and therefore, it would have been obvious to

one skilled in the art at the time of the invention to include Ott's teaching of baud

rate as one of the provisioned parameters of Kao for the purpose of verifying a

modulation rate of the system.

4. Claim 7, 13, 16, 24 and 32 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Kao (cited previously) in view of Mukherjee (cited previously).

Regarding claims 7, 13, 16, 24 and 32, Kao's teaching of a digital subscriber line

(xDSL) communications device comprises a digital engine (DMT Tx Core - 250 in

Fig.2) assigning bits of data for transmission in an allocated bandwidth. (note

col.9, lines 39-45) Further, RAM (430) stores provisional parameters and trained

parameters (note col.11, lines29-48) where the raw data or provisional

parameters are initialized. (note col.11, line 55 – col.12, line 20) The controller

(418 in Fig.4) performs energy and bit loading process where the available

bandwidth is determined by going through the steps of finding minimum and

maximum bit capacities for each subchannel and calculating the total bit rate.

(note col.12, line 21- col.13, line 45) When total power exceeds the power

margin, one of the provisioned parameter, the total bit rate is reduced. (540 in

Fig.5) When reducing bit rates, some of the subchannel may be disabled. (note

col.13, lines 19-29) With the disabling of some subchannels, only a portion of the

available bandwidth is assigned as the allocated bandwidth due to power margin.

As a result, the power spectrum is adjusted to correspond with the allocated

bandwidth, since some of the subchannels are disabled.

However, Kao does not explicitly disclose a line driver providing power across for

transmitting bits of data. Although it is not mentioned by Kao, it is inherent that a

line driver is comprised in Kao's system as it is a critical component needed to

transmit data in any system. Mukherjee teaches dsl system, in the same field of

endeavor, comprising a line driver coupled to a hybrid circuit (see 14 in Fig.1)

where the line driver provides power on the line for transmission. And Mukherjee

further teaches wherein the line driver with the equalizer (see Fig.13) comprises

an amplifier having a feedback loop with a variable complex impedance (wherein

the combination of variable resistor(Rf) and capacitor (Cf) is fed back to an

amplifier) It is known in the art that RC (resistor-capacitor) circuit creates a

complex impedance and the variable resistor (Rf) provides the RC circuit to be

variable. (note col.26, line 59 – col.27, line 50) Therefore, it would have been

obvious to one skilled in the art at the time of invention to include a line driver,

such as Mukherjee's teaching of 14 in Fig.1, coupled to a hybrid block (220 in

Fig.2) for the purpose of effectively transmitting data across the dsl link to a

distant receiver.

5. Claims 8, 17, 25 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Kao (cited previously) in view of Lim in further view of Agah (cited previously).

Regarding claims 8, 17, 25 and 33, Kao in view of Lim teach all subject matter claimed, as applied to claim 1, 10, 18 or 26. However, Kao in view of Lim do not teach selecting an alternative voltage supply level. Agah teaches, in the same field of endeavor, a dsl communication system comprising a line driver. Both Kao and Agah teach changing parameters of the system to reduce power consumption. The line driver changes its analog characteristic (see Table 1 in col.10) depending on the system parameters. (note col.10, lines 42-59) One of the reasons for adjusting the line driver characteristics is to reduce power consumption. Agah further teaches changing the power supply level. (see Table 2 in col.11) Table 2 further shows the amount of power saved by adjusting the characteristics of the line driver. Therefore, it would have been obvious to one skilled in the art at the time of invention to adjust the analog characteristics of the line driver and changing the power supply level upon determination of necessity for the purpose of reducing power consumption.

Allowable Subject Matter

6. Claim 9 is allowed.

7. The following is a statement of reasons for the indication of allowable subject matter: Present application discloses DSL communications device comprising a digital engine, a line driver, a memory, and a controller determining the available bandwidth and adjusting the effective power spectrum corresponding with the allocated bandwidth. Closest prior art, Kao teaches, in the same field of endeavor, a dsl

communication device performing bit and energy configurations of subchannels in the transmission signal. However, Kao does not teach wherein the controller reducing the allocated bandwidth upon detecting a period of reduced activity, and adjusting the power spectrum corresponding with the allocated bandwidth that has been reduced.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Sam Ahn** whose telephone number is **(703) 305-0754**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Stephen Chin**, can be reached at **(703) 305-4714**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

P.O. Box 1450

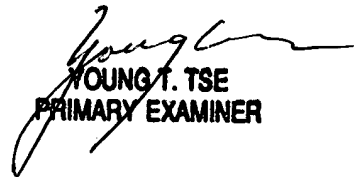Alexandria, VA 22313-1450

or faxed to:

(703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Sam K. Ahn
3/15/04

YOUNG T. TSE
PRIMARY EXAMINER